

# STEM

## Education & Outreach

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### Don't Yuck The Water!

Grade level: K-4

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## Vocabulary

 Vocabulary words are **bolded** throughout the booklet!

**Hypothesis:** A prediction or best guess at what you think might happen.

**Observe:** To watch what happens.

**Absorb:** To soak in.

**Stormwater:** Water that comes from rain or melted snow.

**Runoff:** When **stormwater** cannot soak into the ground and flows over hard surfaces, such as concrete.

**Construction site:** The place where something such as a building, road, or playground is being built.

**Fiber log:** A roll the size of a log made of natural materials such as straw, wood or coconut fiber that is used on **construction sites** to trap or slow dirty water.

**Filter:** To separate one substance or material from another, like separating solids from liquids.

**Strainer:** A tool used to remove dirt or other solids from liquids.

**Waste:** Garbage, leftover material, or things that are thrown away.

**Pollution:** **Waste** or other harmful materials that make something—like water—unclean.

# Background

## Keep the yuck out!

One day Nina is walking with her friend to the park when they see a person wearing a hard hat on a **construction site**. They are carrying a big hairy log! Nina giggles and says, “What is that?”

“It’s a construction **fiber log**. It’s made from the shell of a coconut!” the worker says.

“What is it for?” Nina asks.

“It keeps the yuck out!” said the other worker. “We are making a new bike path to the park. Sometimes while we are working – dirt, oil or other **waste** falls to the ground. If it rains before we get a chance to clean it up, the **runoff** will carry the **waste** right into the ponds or rivers.”



“Oh no! That would be terrible,” said Nina, “it could hurt the fish!”

“Exactly!” said the worker. “Nature has the best **filters**, like plants, grass, and soil, but the process takes time.

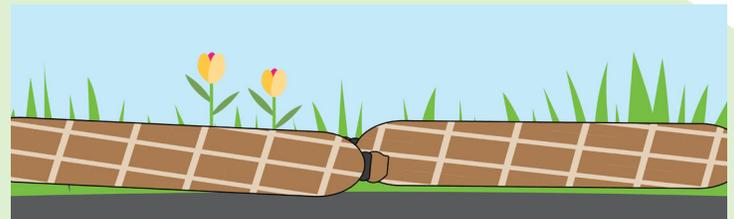


*Stormwater runoff on a road*

These human-made **fiber logs** help a lot because they work fast. They can be placed where they are needed to **filter** the water and stop the yuck from going into the ponds and lakes.”

## Did You Know?

**Stormwater runoff** is melted snow or rainwater that flows over a hard surface (roads, trails, concrete) instead of getting trapped or **absorbed** by soil or plants.



*Fiber logs trap or slow dirty water on construction sites*

When **stormwater** comes from a **construction site**, it can carry loose soil, leaves, grass and **waste** into our lakes and rivers and **pollute** the water that humans, plants, and animals need to survive.

Construction workers use different ways to keep the yuck out when they build. One way is by placing **fiber logs** next to slopes where water drains. The logs slow down and **filter** the **stormwater**. **Fiber logs** can be made of straw, wood or coconut fiber which trap the **waste** from getting into the soil and water.

Over longer periods of time, nature has the best **filters**. Plants, grass, and top soil “clean” the water by removing the smaller **waste** that gets through human-made **filters**, keeping it safe to swim in or drink.

Here’s your chance to be a scientist! Try the experiment below to see how the different materials can trap and **filter** dirty water from polluting our drinking water.



### Fact:

It’s a matter of time! Leaves, plants, and worms work as the earth’s natural filters keeping the yuck out, but it can take months or even years.



## Word Search

Can you find these vocabulary words in the word search below?

U	W	A	S	T	E	R	H	H	D
U	C	R	B	H	U	K	W	Z	D
S	T	O	R	M	W	A	T	E	R
G	S	T	R	A	I	N	E	R	J
F	E	F	I	B	E	R	L	O	G
I	P	O	L	L	U	T	I	O	N
L	R	U	N	O	F	F	O	Z	C
T	A	B	S	O	R	B	Z	Z	J
E	N	O	S	D	U	I	E	Y	F
R	G	S	O	B	S	E	R	V	E

Absorb  
Observe  
Filter

Fiber Log  
Strainer  
Pollution

Stormwater  
Runoff  
Waste

## Materials

1. A pitcher of “dirty” water (3 cups)
2. A set of measuring cups
3. Ruler
4. 3 empty containers (preferably see-through) such as jars, cups, bowls, cans, etc, to catch water.



## Materials

5. 3 paper cups with small holes in the bottom that can fit in the empty containers.
6. Leaves, mulch and/or grass
7. Timer
8. Spoon





# Activity

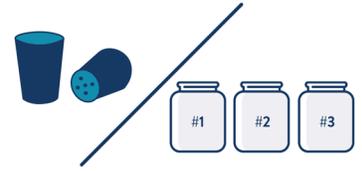
## 1. Prepare polluted or “dirty” water:

- Pour three cups of water into a pitcher or other container.
- In the water, add dirt, gravel (small rocks), small pieces of trash- anything you can find outside. You could also use compost, used coffee grounds, fruit and vegetable peels, toast crumbs, etc. Be sure to wash your hands after!

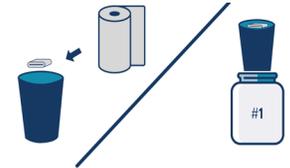


## 2. Prepare cups:

- Poke pencil-sized holes in the bottom of three paper cups. These are your **strainers**.
- Label each empty container #1, #2, and #3.



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- ## 3. Fold the paper towel into a square and stuff it into the bottom of strainer cup #1. Place the strainer cup over empty container #1.



4. Take another strainer cup and fill with grass and leaves or mulch. Place the strainer over container #2.



5. Leave the last strainer empty and place over container #3.



6. Predict which material will clean the water best. Predict which material will leave the most sediment (left over material). Predict which filter will absorb the most water.

I predict \_\_\_\_\_ will clean the water best.

I predict \_\_\_\_\_ will leave the least sediment (left over materials).

I predict \_\_\_\_\_ will absorb the most water.

7. Gently stir your pitcher of polluted/dirty water with a spoon and then slowly pour 1 cup of polluted/dirty water into each of your paper cup strainers without spilling, collecting the liquid that passes through at the bottom of each container.

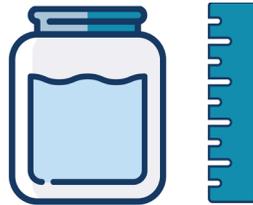


8. After pouring the water over all 3 materials, set a timer for 3 minutes. **Observe** what happens.

3 minutes



9. When time is up, take the strainer cups off the containers and measure the remaining water in each container. Use a ruler or measuring cup. Record this number in your data table.



## Data Table

Before: What material is in the cup?	After: How much water is left in the cup?	After: How clean is the water? (circle one)
Paper towel		 very clean/clear      dirty or lots of sediment
Grass/leaves		 very clean/clear      dirty or lots of sediment
None		 very clean/clear      dirty or lots of sediment

# Conclusion

Conclusions help us understand what happened in an experiment.



1. Which materials filtered the water best in the experiment? Why do you think so?

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2. Which material absorbed or slowed the water best? Why do you think so?

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3. Explain why it is important for construction sites to use fiber logs to protect our environment. What will happen if they do not use human-made filters?

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4. How does nature protect itself against stormwater run-off?

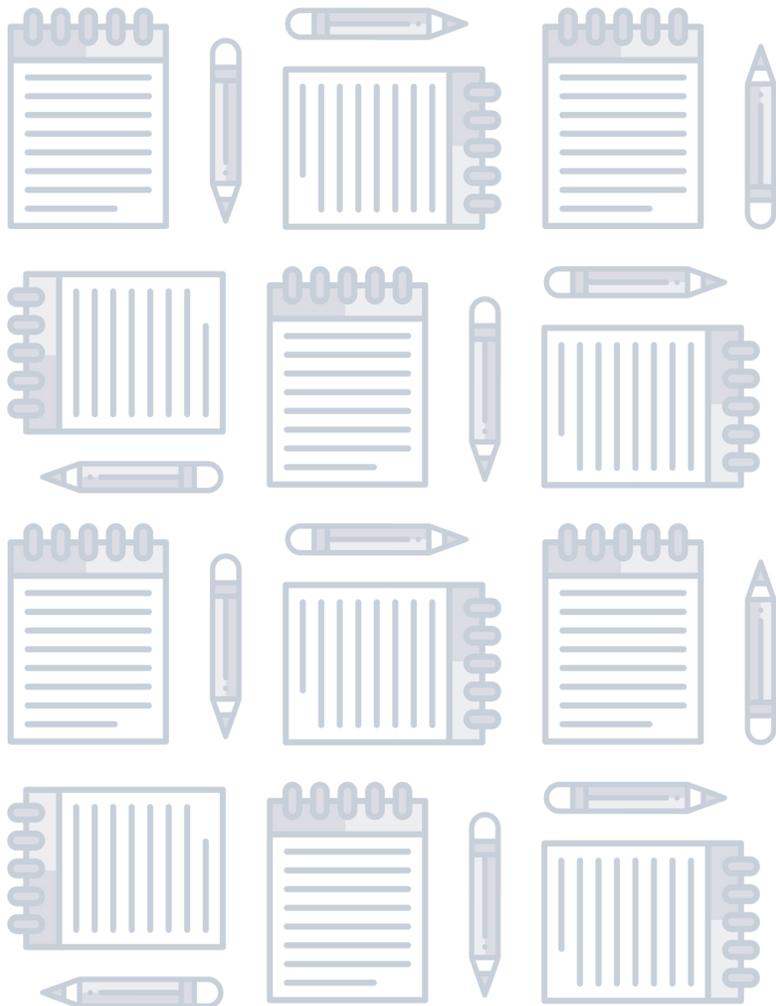
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# Lesson Plan

Adults can cut out this lesson plan to help guide students.

## Where does the water go?

**Subject:** Science

**Grade level:** K-4 (younger students need adult support)

**Time:** 40 minutes

**Overview:** Students will conduct an experiment to see how filtering stormwater can help protect lakes and rivers.

**Objectives:**

- Make a **hypothesis** about what will happen
- **Observe** what happens
- Explain what happened using words

**Essential Question:** What happens when rainwater falls on a **construction site**? How do we prevent construction **waste** (garbage, chemicals, etc.) from being carried by rainwater and **polluting** our lakes, rivers, and ponds?





# Lesson Plan

## Materials:

- A pitcher of “dirty” water (3 cups)
- A set of measuring cups
- Ruler
- 3 empty containers (preferably see through) such as jars, cups, bowls, cans, etc. to catch water
- 3 paper cups with small holes in the bottom that can fit in the empty containers
- Leaves, dirt and/or grass (and adult support to help students collect them safely)
- Timer
- Spoon

## Instructions:

1. Prepare **polluted** or “dirty” water by adding dirt, gravel (small rocks), small pieces of trash- anything you can find outside.
2. Prepare 3 cups by poking pencil-sized holes in the bottom of each paper cup.
3. Label each empty container #1, #2, and #3.
4. Fold the paper towel into a square and stuff it into the bottom of **strainer** cup #1. Place the **strainer**



# Lesson Plan

- cup over empty container #1.
5. Take another **strainer** cup and fill with grass and leaves or mulch. Place the **strainer** over container #2.
6. Leave the last **strainer** empty and place over container #3.
7. Make predictions about which materials will clean and **absorb** the water best.
8. Gently stir your pitcher of polluted/dirty water with a spoon and then slowly pour 1 cup of **polluted** or dirty water into each of your paper cup **strainers** without spilling, collecting the liquid that passes through at the bottom of each container.
9. After pouring the water over all 3 materials, set a timer for 3 minutes. **Observe** what happens.
10. When time is up, take the **strainer** cups off the containers and measure how much water passed through into each container.
11. Which container has the cleanest water? Which paper cup has the most left over materials at the bottom?



**My Notes**

A large, empty rectangular box with a dark blue border, intended for writing notes.



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A large, empty rectangular box with a dark blue border, intended for writing notes.

